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EXAMINER	
JACOB, MARY C	
ART UNIT	**PAPER NUMBER**
2123	

DATE MAILED: 08/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	**Application No.** 10/678,729	**Applicant(s)** LINDBERG, STEN
	Examiner Mary C. Jacob	**Art Unit** 2123

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 October 2003*.
2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.
  4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) *1-15* is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.
10)☒ The drawing(s) filed on *03 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.
  Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
  Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  a)☐ All b)☐ Some * c)☐ None of:
    1.☐ Certified copies of the priority documents have been received.
    2.☐ Certified copies of the priority documents have been received in Application No. _____.
    3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
  * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
  Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
  Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-15 have been presented for examination.

2. The Preliminary Amendment filed 11/15/04 has been considered.

Specification

3. The disclosure is objected to because of the following informalities: page 4, line 7 recites, "By designing is meant", it would be better if written, "By designing, it is meant". Appropriate correction is required.

Claim Objections

4. Claims 2, 4, 10 and 12 are objected to because of the following informalities. Appropriate correction is required.

5. Claim 2 recites "the material" it would be better if written, "a material".

6. Claim 10, lines 4 and 6 have periods at the end.

7. Claim 12 recites "comprises" in line 9, it would be better if written, "comprising".

Claim Rejections - 35 USC § 112

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 1-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

10. Claims 1, 12 and 13 recite, “a computer implemented method of designing” and further recite “the method having access to”. It is unclear if the claims are directed to a method of design or a method having “access to”. Further, if the claim is directed to a method “having access to”, it is unclear as to what statutory category this claim would belong to since it is not directed to a method or process.

11. Claims 1, 12 and 13 further recite “the value of a geometrical size of the hydraulic element” in line 15. It is unclear as to whether this limitation is referring to “a geometrical parameter representing geometrical size and shape of the hydraulic element”, or whether “the value of a geometrical size” and “a geometrical parameter” are two separate parameters.

12. Claim 1 recites the limitations: "the geometrical size" in line 1; “the flow” in line 7; “the numerical representation of the hydraulic system” in line 8; “the value of a geometrical size” in line 15. There is insufficient antecedent basis for these limitations in the claim.

13. Claim 4 recites, “based on the size and shape of the pipe or channel” in line 15. It is unclear as to whether “the size” refers to “the geometrical size” as previously set forth in line 2, or whether it is a new limitation. If it does not refer to “the geometrical size”, there is lack of antecedent basis for this limitation in the claim.

14. Claim 5 recites, “selected from the group of” and then follows with limitations connected by “and/or” statements. It is unclear as to whether the intention of this claim is to select one of the following limitations (level of a fluid, flow rate or pressure), or whether the intention of the claim is to include all of the following limitations.

15. Claim 7 recites the limitation "the selected simulated measure" in lines 2-3. There is insufficient antecedent basis for this limitation in the claim. Claim 7 further recites, “predefined threshold value”, however, there is unclear as to what the “predefined threshold value” is and there is no explanation in the specification to give adequate meaning to this limitation.

16. Claim 8 recites the limitation "the regulated value of the geometrical size" in lines 3-4. There is insufficient antecedent basis for this limitation in the claim.

17. Claim 11 recites, “the numerical representation”. It is unclear as to which “numerical representation” in Claim 1 is being further limited: the “numerical representation of simulated measures of the flow” in line 7, or “the numerical representation of the hydraulic system” in line 8. Claim 11 further recites, “the solution of the Saint-Venant equations” in line 2. There is insufficient antecedent basis for this limitation in the claim.

18. Claim 12 recites, “a computer readable medium for making a computer execute the following method”. This terminology renders the claim vague and indefinite since it is unclear how the medium can make the computer do anything nor is it disclosed that the medium is run on a computer. Further, there is no definition of what the “computer readable medium” is in the specification. The claim also recites the limitations: "the

hydraulic element" in line 3, "the flow" in line 6 and "the hydraulic system" in line 7. There is insufficient antecedent basis for this limitation in the claim.

19. Claim 13 recites the limitation "the flow" in line 7. There is insufficient antecedent basis for this limitation in the claim.

20. Claim 14 recites the limitations: "the geometrical size" in line 1; "the flow" in line 5; "the numerical representation of the hydraulic system" in line 6; "the value of a geometrical size" in line 7. There is insufficient antecedent basis for these limitations in the claim.

21. Due to the number of 35 U.S.C. 112, second paragraph rejections, the examiner has provided a number of examples of the claim deficiencies in the above rejection(s), however, the list of rejections may not be inclusive. Applicant should refer to these rejections as examples of deficiencies and should make all necessary corrections to eliminate the 35 U.S.C. 112, second paragraph problems and place the claims in proper format.

Due to the vagueness and a lack of a clear definition of the terminology and phrases used in the specification and claims, the claims have been treated on their merits as best understood by the examiner.

Claim Interpretation

22. Claim 5 recites, "selected from the group of" and then follows with limitations connected by "and/or" statements. This was interpreted to read as if one of the following

limitations is selected: level of a fluid in a hydraulic element, flow rate of the fluid in the hydraulic element and pressure in the hydraulic element.

23. Claim 8 recites the limitation "the regulated value of the geometrical size", however, there is lack of antecedent basis for this limitation in the claim. Since "regulating the calculated value of the flow capacity by adjusting the flow capacity" was disclosed in Claim 1, Claim 8 was interpreted to the step of regulating the flow capacity is reiterated with the adjustment of flow capacity of a design criterion is not fulfilled.

Claim Rejections - 35 USC § 101

24. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

25. Claims 1-15 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claims 1, 12, 13 and 14 recite the result "calculating the value of a geometrical size of the hydraulic element", however, the claims recite no useful, concrete or tangible result since the resulting calculated value of geometrical size is not applied in a disclosed practical application or made available to be used in a disclosed application. Claim 12 further recites "a computer readable medium for making a computer execute the following method when run on a computer", however, the claim is directed to non-functional descriptive subject matter because the steps to the method are directed to abstract ideas that do not provide the necessary functional and structural relationship with the "computer readable medium".

Claim Rejections - 35 USC § 103

26. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

27. Claims 1-5, 7-10, 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Georgia Stormwater Management Manual (Georgia Stormwater Management Manual, Volume 2: Technical Handbook, First Edition, August 2001, pages 4.2-26-4.2-36), herein referred to as GSMM, in view of Vongvisessomjai et al ("Modeling of Potential Locations with Sediment Deposits for the Sewer System in Pattaya, Thailand", 1st Asia-Pacific DHI Software Conference, Bangkok, Thailand, June 17-19, 2002).

28. As to Claims 1, 12, 13 and 14, GSMM teaches: designing the geometrical size of a hydraulic element in a hydraulic system composed of hydraulic elements (page 4.2-26, "Step 4", sentence 1); the method having access to: a geometrical parameter representing geometrical size and shape of the hydraulic element (equations 4.2.13 and 4.2.14, "R" and "A") and a flow resistance parameter representing flow resistance properties of the hydraulic element (equations 4.2.13 and 4.2.14, "n"); a numerical representation of measures of the flow (Figures 4.2-13, 4.2-14 and 4.2-15, "Discharge" and "Quantity of Flow"); wherein the numerical representation of the hydraulic system is open to changes in a calculated flow capacity through changes in a value of the flow resistance parameter (equations 4.2.13 and 4.2.14, wherein "V" and "Q" will change as

any of the parameters in the equations change such as "n"); the method comprising the steps of: using measures of the flow at discrete instances of time and at discrete instances of space of the hydraulic system (Figures 4.2-13, 4.2-14 and 4.2-15, "Discharge" and "Quantity of Flow"); regulating a calculated value of the flow capacity in response to a design criterion through regulating the design parameters of storm drain pipes (section 4.2.8.3, bullet 1, wherein the design criterion is for a "flow full" capacity; equations 4.2.13, 4.2.14, and Figures 4.2-13, 4.2-14 and 4.2-15 wherein the equation parameters are chosen and solved for); and calculating the value of a geometrical size of the hydraulic element from the regulated value of the flow capacity and a specified flow resistance parameter (section 4.2.8.3, bullet 1; equations 4.2.13, 4.2.14; section 4.2.8.5 and Figures 4.2-13, 4.2-14 and 4.2-15, wherein the parameters of the pipe geometry are solved for based on design criteria).

29. GSMM does not expressly teach: a numerical representation of simulated measures of the flow, simulating measures of the flow at discrete instances of time and discrete instances of space of the hydraulic system and regulating a calculated value of the flow capacity by adjusting the flow resistance parameter to obtain a regulated value of the flow capacity.

30. Vongvisessomjai et al teaches sewer system mathematical models used to simulate the amounts and locations of sediment deposits in a sewer system, wherein the models are calibrated to reproduce satisfactorily known conditions for a particular period, since sediment deposits in sewers reduce the hydraulic capacity of sewer systems and knowledge attained from models would allow for appropriate measures to

be taken for optimal operation of the sewage system, e.g., better planning of maintenance scheme and design of sewer system (Background; page 4, "Model Calibration). Vongvisessomjai et al teaches the calibration of a pipe flow model by using the result of surface runoff models as input to simulate the discharge and water level in a pipe (simulate flow) and calibrating the model by changing pipe parameters such as a flow resistance parameter, Manning's number, and fixing this parameter when the results of the model are close to observed data (page 3, "Model Setup, paragraph 1; page 4, "Hydrological and Hydrodynamics Model Calibration", paragraph 1, sentences 3-7).

31. GSMM and Vongvisessomjai et al are analogous art since they are both directed to the design of a pipe system using measures of flow and varying parameters of the pipe design.

32. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the designing of a geometrical size of a hydraulic element as taught in GSMM to include the simulation of measures of flow and adjusting the flow resistance parameter to obtain a regulated value of flow capacity as taught in Vongvisessomjai et al since Vongvisessomjai et al teaches that knowledge attained from sewer system mathematical models, calibrated to reproduce satisfactorily known conditions for a particular period, would allow for appropriate measures to be taken for optimal operation of the sewage system, e.g., better planning of maintenance scheme and design of sewer system (Background; page 4, "Model Calibration).

33. As to Claim 2, GSMM as modified by Vongvisessomjai et al teach wherein the flow resistance parameter comprises roughness of the material of the hydraulic element (GSMM: equations 4.2.13, 4.2.14, “n”).

34. As to Claims 3 and 15, GSMM as modified by Vongvisessomjai et al teach: wherein the value of the geometrical size is calculated from the specified value of the flow resistance parameter, a value of the regulated value of the flow capacity, and specified geometrical shape and slope of the hydraulic element (GSMM: equations 4.2.13, 4.2.14; section 4.2.8.5 and Figures 4.2-13, 4.2-14 and 4.2-15).

35. As to Claim 4, GSMM as modified by Vongvisessomjai et al teach: wherein the hydraulic element is a pipe or channel and the value of the geometrical size (A;R) is calculated from the specified geometrical shape (A,R) of the pipe or channel, a specified roughness parameter (M), a specified geometrical slope (S) of the pipe or channel, and the regulated value of the flow capacity (Q) in accordance with the following equation: $Q=MAR^{2/3}\sqrt{s}$ where: Q is the flow capacity, M is Manning's number which represents the roughness of the material of the inside wall of the pipe or channel, A is the cross-sectional flow area of the pipe or channel, R is the hydraulic radius of the pipe or channel, S is the pipe slope of the pipe or channel (GSMM: equations 4.2.13 and 4.2.13 and descriptions); the method having access to a procedure for determining the cross-sectional flow area and the hydraulic radius based on the size and shape of the pipe or channel (equations 4.2.13-4.2.16, section 4.2.8.5 and Figures 4.2-13, 4.2-14 and 4.2-15).

36. As to Claim 5, GSMM as modified by Vongvisessomjai et al teach: wherein a simulated measure of the flow is selected from the group of: level of a fluid in the hydraulic element and/or flow rate of the fluid in the hydraulic element and/or pressure in the hydraulic element (Vongvisessomjai et al, page 3, "Model Setup", paragraph 1, sentences 3-4; page 4, "Hydrological and Hydrodynamics Model Calibration, paragraph 1, sentence 3).

37. As to Claim 7, GSMM as modified by Vongvisessomjai et al teach: wherein the value of the flow resistance parameter is regulated in response to the difference between a value of the selected simulated measure and the design criterion in the form of a predefined threshold value (Vongvisessomjai et al, page 4, "Hydrological and Hydrodynamics Model Calibration, paragraph 1, sentences 3-7).

38. As to Claim 8, GSMM as modified by Vongvisessomjai et al teach: wherein the step of regulating a calculated value of the flow capacity is performed over a finite period of time (Vongvisessomjai et al, page 4, "Model Calibration", sentence 1); and wherein the step of regulating the calculated value is reiterated with the adjustment of flow capacity if a design criterion is not fulfilled (Vongvisessomjai et al, page 4, "Hydrological and Hydrodynamics Model Calibration", sentences 3-7).

39. As to Claim 9, GSMM as modified by Vongvisessomjai et al teach: wherein the step of simulating measures is performed over a series of finite length (Vongvisessomjai et al, page 4, "Model Calibration", sentence 1; GSMM: Figures 4.2-13, 4.2-14 and 4.2-15, "Discharge" and "Quantity of Flow"); and wherein the step of calculating a value of the geometrical size is performed when the step of simulating measures over the series

of finite length has elapsed (Vongvisessomjai et al, page 4, "Hydrological and Hydrodynamics Model Calibration", sentences 3-7 wherein pipe parameters are changed during calibration until results are close to observed data; GSMM: equations 4.2.13-4.2.16; section 4.2.8.5; Figures 4.2-13-15; wherein the size is calculated after parameters for V, Q, S, D and n are known from the figures).

40. As to Claim 10, GSMM as modified by Vongvisessomjai et al teach: wherein the hydraulic system is of at least one of the following groups: wastewater systems, storm drainage systems, combined sewer systems, wastewater treatment facility hydraulic systems, irrigation systems (GSMM: 4.2.8.1, first sentence).

41. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over GSMM as modified by Vongvisessomjai et al as applied to claim 1 above, and further in view of Steil et al (US Patent 6,558,351).

42. As to Claim 6, GSMM as modified by Vongvisessomjai et al teach adjusting the flow resistance parameter to obtain a regulated value of flow capacity.

43. GSMM as modified by Vongvisessomjai et al do not expressly teach wherein the value of the flow resistance parameter is regulated during simulations by means of a simulated PID (Proportional, Integral and Differential) regulator strategy.

44. Steil et al teaches a closed loop infusion system that controls the rate that fluid is infused into the body of a user including a sensor system, a controller and a delivery system (Abstract), wherein the insulin response is modeled using a PID controller to command the infusion device to release insulin into the body at a rate that causes the

insulin concentration in the blood to follow a similar concentration profile as would be caused by fully functioning human β-cells responding to blood glucose concentrations in the body (column 9, lines 42-49), the PID controller is selected since PID algorithms are stable for a wide variety of non-medical dynamic systems and have been found to be stable over widely varying disturbances and changes in system dynamics (column 10, lines 10-16).

45. GSMM as modified by Vongvisessomjai et al and Steil et al are analogous art since they are both directed to the regulating of fluid flow throughout a fluid transport system.

46. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the adjustment of the flow resistance parameter as taught by GSMM as modified by Vongvisessomjai et al to regulate the fluid flow by means of a simulated PID controller as taught by Steil et al since Steil et al teaches the selection of a PID controller to regulate fluid flow since PID algorithms are stable for a wide variety of non-medical dynamic systems and have been found to be stable over widely varying disturbances and changes in system dynamics (column 10, lines 10-16).

47. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over GSMM as modified by Vongvisessomjai et al as applied to claim 1 above, and further in view of Jin et al (US Patent 7.039,565).

48. As to Claim 11, GSMM as modified by Vongvisessomjai et al teach numerical representations of measures of the flow.

49. GSMM as modified by Vongvisessomjai et al do not expressly teach wherein the numerical representation is a dynamic, one-dimensional model based on the solution of the Saint-Venant equations.

50. Jin et al teaches an improvement and extension of the FLOODWAVE National Weather Service routing model, or other similar software, to provide solutions for the complete and extended one-dimensional Saint-Venant continuity and momentum equations to describe sewer branches in sewer networks, internal and external boundaries as well as pressure flows and street flooding conditions (column 2, lines 37-51) wherein the Saint-Venant equations of one-dimensional unsteady flow in non-parasitic channels or conduits are the basic equations for describing unsteady sewer flows (column 3, lines 20-25).

51. GSMM as modified by Vongvisessomjai et al and Jin et al are analogous art since they are both directed to the simulation of fluid flow in a storm water pipe system.

52. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the numerical representation of measures of the flow as taught by GSMM as modified by Vongvisessomjai et al to use a one dimensional model based on a solution of the Saint-Venant equations as taught by Jin et al since Jin et al teaches an improvement and extension of the FLOODWAVE National Weather Service routing model, or other similar software, to provide solutions for the complete and extended one-dimensional Saint-Venant continuity and momentum equations to describe sewer branches in sewer networks (column 2, lines 37-51).

Conclusion

53. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

54. Keane (US Patent 6,381,562) teaches an approach for analyzing bio-transport dynamics by simulating, a bio-transport system of an organism, the simulation model enabling a user to make decisions regarding the configuration of a bio-transport system and to see the effects of these decisions on a system's bio-transport dynamics, such as, for example, fluid flow rates, pressure gradients, chemical and biological concentrations and fluid temperatures, at various points in time and space.

55. Sage (US Patent 6,829,566) teaches method of optimizing proposals for pipes within a network without violating operating criteria of the network, determining the hydraulic significance of pipes within a pipe network, and determining the peak flow requirements of each pipe.

56. Hongjiang et al ("Movement Properties of the Pipe Flow Along Granite Slope of the Three Gorges Area on Yangtze River in China", 12th ISCO Conference, Beijing 2002) teaches the development of a pipe flow model based on investigated data of soil, landform and land use with observed data of pipe flow derived from rainfall events.

57. City of Temple ("Drainage Criteria and Design Manual" pages 5-83-5-93, last modified 4,12/02, obtained on: http://www.ci.temple.tx.us/departments/manual1.pdf) teaches the design of storm sewer systems through the use of Manning's Equation, taking into account pipe sizes and material types.

58. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mary C. Jacob whose telephone number is 571-272-6249. The examiner can normally be reached on M-F 7AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Rodriguez can be reached on 571-272-3753. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Mary C. Jacob
Examiner
AU2123

MCJ
8/8/06

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